

TA
901
AS126
Engineering
Library

Activities of the A.S.T.M. in 1933

A review of the major activities and accomplishments of the Society and its committees for the past year and, at the same time, an indication of what work is ahead for 1934.

Washington Regional Meeting

A Symposium on Outdoor Weathering of Metals and Metallic Coatings will be held on March 7. Spring Group Committee Meetings are scheduled for week of March 5.

•
January, 1934

BULLETIN

AMERICAN SOCIETY FOR
TESTING MATERIALS

260 S. BROAD STREET



PHILADELPHIA, PENNA.

KIMBLE BRAND *Condensers*

NO INDUSTRIAL or educational laboratory doing test, control and research work is really complete without an assortment of Kimble Condensers. The same high quality of workmanship, the same painstaking care in fabrication, is put into these condensers as is employed in the making of Kimble's finest graduated glassware.

IMPORTANT FEATURES

1. THOROUGHLY RETEMPERED (STRAIN-FREE) TO INSURE MAXIMUM STRENGTH.
2. All seals are well made to avoid thin spots.
3. Heavy walled tubing is used throughout.
4. The ends of the condenser tubes are ground.
5. Hose connections for the cooling water are uniform and made to fit hose $\frac{1}{4}$ " inside diameter.
6. Entirely hand-made by expert craftsmen.
7. Sizes and dimensions are those adopted by standardization committees of the Scientific Apparatus Makers of America, and of the American Chemical Society.

Kimble Condensers and Kimble Exax Graduated Laboratory Glassware are stocked by leading laboratory supply houses throughout the United States and Canada.

KIMBLE GLASS COMPANY

VINELAND, NEW JERSEY.
NEW YORK • PHILADELPHIA • BOSTON • CHICAGO • DETROIT

EXAX



NORMAX



AMERICAN SOCIETY FOR TESTING MATERIALS BULLETIN

260 SOUTH BROAD STREET

PHILADELPHIA, PA.

NUMBER 66

JANUARY 31, 1934

Symposium on Outdoor Weathering of Metals at Washington Meeting

Regional Meeting to be Held on March 7 During Committee Week

A SYMPOSIUM on Outdoor Weathering of Metals and Metallic Coatings will feature the 1934 Regional Meeting of the Society to be held in the Wardman Park Hotel, Washington, D. C., on Wednesday, March 7. The 1934 Spring Group Meetings of A.S.T.M. Committees will also be held in Washington beginning Monday, March 5 and extending through Friday, March 9. The technical session in which the symposium is to be held is scheduled for the afternoon of March 7 and will be followed by a dinner at 6.30 in the evening.

The Local Committee on Arrangements, headed by A. C. Fieldner, Chief Engineer, Experiment Stations Division, U. S. Bureau of Mines, has practically completed plans for the meeting and dinner. The members have been particularly fortunate in their efforts to obtain interesting speakers at the dinner. Mr. Willard T. Chevalier, Publishing Director, McGraw-Hill Publishing Co., has graciously consented to act as toastmaster. Assistant Secretary of the Treasury Lawrence W. Roberts, in charge of the procurement division, will be present and will speak informally. As principal speaker of the evening, the committee expects to secure one of the men who has taken a very active part in the consumer side of N.R.A. directly associated with the studies of development of consumer standards.

Corrosion an Involved Subject

The problem of corrosion is one of the most difficult ones with which technical men and engineers must contend. It is always interesting to note the various estimates of annual loss due to corrosion which are made by various authorities. For instance, one estimate has been made that the annual world loss due to corrosion approaches about \$1,500,000,000. In terms of the steel produced in an average year in the United States this figure would represent roughly half of its value.

A great deal of work is being carried on by many organizations and companies to determine causes of corrosion and its prevention and many hypotheses have been evolved. The problem is so involved that even to attack a small portion

of it would require many times the period which is devoted to an average A.S.T.M. regional meeting, and for this reason it was decided to confine the technical session of the meeting to one very important subject in the corrosion field.

Both Committees A-5 on Corrosion of Iron and Steel and B-3 on Corrosion of Non-Ferrous Metals and Alloys have sponsored important atmospheric test programs for many years and the annual reports of these groups each year give some indication of the extent of their activities. The Symposium on the Outdoor Weathering of Metals and Metallic Coatings, sponsored by these two committees will be quite appropriate. The committee in charge of its development, the personnel of which was announced in the December BULLETIN, is headed by F. F. Farnsworth, Bell Telephone Laboratories, Inc. Four papers will be presented to open the discussion:

1. OUTDOOR TEST RESULTS ON BARE AND METAL-COATED FERROUS SPECIMENS—C. D. Hocker, Chemical Engineer, Bell Telephone Laboratories, Inc.
2. HOW SOON IS IT SAFE TO DRAW CONCLUSIONS?—A DISCUSSION OF THE EARLY INTERPRETATION OF TEST RESULTS IN THE ATMOSPHERIC CORROSION OF NON-FERROUS METALS AND ALLOYS—W. H. Finkeldey, Metallurgist, Singmaster & Breyer.
3. GALVANIC CORROSION BY CONTACT OF DISSIMILAR METALS—C. L. Hippensteel, Technical Staff, Bell Telephone Laboratories, Inc.
4. THE HARMONY OF OUTDOOR WEATHERING TESTS—R. F. Passano, Research Laboratories, American Rolling Mill Co.

The authors of these papers will not be limited to the conclusions of opinions that have been stated officially by Committees A-5 and B-3. Broadly, the purpose of this symposium is to make conveniently available, so that it can be put to the maximum use, the wealth of information developed by these two A.S.T.M. committees.

A good deal of interest has already been evinced in the symposium and it is expected there will be considerable discussion. In fact, the committee in charge definitely limited the number of papers so that time will be available for all who are interested to discuss any particular phase of the problem.

The papers listed for presentation will be preprinted and distributed in advance of the meeting in order to stimulate discussion and bring out other viewpoints. Members who desire a copy of the preprint pamphlet should fill in and return the enclosed request card.

Group Meetings of Committees

Members who have been long affiliated with A.S.T.M., and especially committee members, appreciate the significance and purpose of Committee Week. It was instituted to conserve the time and expenses of the large number of members who serve on several different committees. Very careful study is made by the headquarters staff in cooperation with the committee officers to prepare a schedule resulting in a minimum of conflicts. For the past few years, there has never been a Committee Week during which there were less than 100 meetings of standing committees and their subgroups. This year will probably be no exception and there follows a list of committees which thus far have signified their intention of holding meetings in Washington.

A-1 on Steel	D-2 on Petroleum Products and Lubricants
A-2 on Wrought Iron	D-4 on Road and Paving Materials
A-3 on Cast Iron	D-5 on Coal and Coke
A-5 on Corrosion of Iron and Steel	D-8 on Bituminous Waterproofing and Roofing Materials
A-10 on Iron-Chromium, Iron-Chromium-Nickel and Related Alloys	D-13 on Textile Materials
B-3 on Corrosion of Non-Ferrous Metals and Alloys	E-4 Sub I on Preparation of Samples
C-1 on Cement	Joint ASME-ASTM Research Committee on Effect of Temperature on the Properties of Metals.
C-3 on Brick	Coordinating Committee on Non-Ferrous Metals and Alloys.
C-9 on Concrete and Concrete Aggregates	
C-10 on Hollow Masonry Building Units	
C-11 on Gypsum	
C-13 on Concrete Pipe	

This list is by no means final, since returns have not been received from many of the committees who may meet and of course last-minute changes often occur in the plans of some of the committees. A complete schedule of meetings will be mailed about February 20 to all members of the groups which are meeting.

Reduced Railroad Rates

Application has been made to the passenger associations for reduced fares to Washington during the regional meeting and the spring group committee meetings. These reductions have been granted for several years and it is fully expected they will be in effect this year. The reduction will be on the certificate plan at fare and one-half for the round trip, provided the same route is used both going and returning and provided further that 100 certificates are turned in for validation.

Members should purchase the regular one-way ticket to Washington at their railroad ticket office and must secure a certificate (*not a receipt*) from the ticket agent when making the purchase. These certificates will be validated by the railroad representative at the A.S.T.M. registration desk in the Wardman Park Hotel. Members will then be able to purchase the return ticket at one-half fare. These special rates will afford a considerable saving to many of our members and it is accordingly urged that each member secure a certificate whether or not he intends to use it, and to deposit it at the registration desk immediately on his arrival, since the reduction in rates cannot become effective until 100 certificates have been turned in. *Be sure to get your certificate when you purchase your ticket for Washington.*

Interesting Annual Meeting in Prospect

Judging from the many papers which have been offered for presentation at the 1934 annual meeting, which is to be held in Chalfonte-Haddon Hall, Atlantic City, June 25-29, and from the interest being shown in suggested topics to which sessions will be devoted, a highly interesting meeting is in prospect.

Committee E-6 on Papers and Publications will meet late in February to review all offers of papers which have been submitted and to consider topics proposed for discussion in order that a well rounded technical program may result. It is apparent from the many committee activities in progress, some of which are described in this BULLETIN, that the reports these groups will contribute may arouse considerable interest and discussion. A more detailed announcement concerning the meeting will be given in the March BULLETIN and it is planned to include the Provisional Program in the April issue.

Committee on Petroleum Has Active Program

The recent meetings held in Detroit on January 19 and 20 under the auspices of A.S.T.M. Committee D-2 on Petroleum Products and Lubricants were interesting and very profitable ones. The activities of Technical Committees B on Motor Oils and A on Gasoline are of special significance.

In the work of Technical Committee B on Motor Oils, it is recognized that lower viscosities are being encouraged by the automotive and petroleum industries and that while such lower viscosity motor oil may give better lubrication, including possibly longer life of bearings, the use of such oils is attended with somewhat larger consumption. The point to be stressed to the layman in this connection is that a small part of what he saves in gasoline bill and repairs he must expect to spend for somewhat more lubricant.

The problems before Technical Committee B are made more difficult by the changes coming into automobile design and construction such, for example, as decreased bearing clearances, the displacement of babbitt with copper-lead and other bearing metals. Another subject being studied is the pumpability of motor oils in service, particularly at low temperatures.

The major consideration at the meetings of Technical Committee A was the discussion of preparation of specifications for motor gasoline. It was the opinion, particularly of consumer members, that the consumer interest would be best served if the committee would undertake to prepare and supply to the public, through the A.S.T.M., a treatise on the meaning of the items properly included in gasoline specifications. By unanimous vote it was decided to proceed with this work.

Progress reports were presented to this technical committee in connection with vapor lock and gum and it also received a report prepared under the auspices of the Cooperative Fuel Research Committee on the "Reproducibility of A.S.T.M. Method for Octane Number." This report shows that with the A.S.T.M. equipment properly adjusted, octane number determinations in accordance with the A.S.T.M. method differ by less than two octane numbers and the average error is less than 0.5. Also, that errors greater than one octane number are usually caused by improper engine conditions.



Major Accomplishments of A.S.T.M. in 1933

Extensive Work of Committees Described

EACH year, the January BULLETIN carries an article written in a retrospective vein. A general title might be "The Annual Review Article," for its purpose is to look over the work for the previous twelve months and make some sort of an evaluation. This inventory is considered very worth while for it gives the members a composite picture of A.S.T.M. activities and also is of service in determining just what progress has been made. Following the more general matters, there are detailed the more important committee accomplishments, with in many cases, a glance into the current programs. This material is so arranged that any reader interested in specific fields of committee work can directly and conveniently refer to these subjects.

Annual and Regional Meetings

The annual meeting always is the high point in the Society year and 1933 was no exception. It will be recalled that the Thirty-sixth Annual Meeting was held in Chicago during Engineering Week, at which time leading national engineering and technical societies and associations met. The A.S.T.M. meeting focused attention on the important work it is doing in the engineering materials field. From the standpoint of progress the meeting was an outstanding one. The number of committee meetings was fully as great as in normal years and for the most part the meetings were very well attended.

The Second Exhibit of Testing Apparatus and Equipment drew many favorable comments, and in the booths sponsored by companies in the industry, and by other institutions and A.S.T.M. committees, was displayed a great deal of new apparatus for various standardized and special tests.

There were the usual number of interesting technical contributions and among these the Symposium on Cast Iron was outstanding. The symposium was another in the series sponsored jointly by the American Foundrymen's Association and the Society for the purpose of providing in convenient, concise form reliable information and data on the properties of castings.

Two committee reports were of unusual interest in that they made available valuable information on specific phases of their work. The Report of Committee C-9 on Concrete and Concrete Aggregates included an extensive discussion by outstanding authorities on the Significance of Tests of Concrete and Concrete Aggregates. The features of this discussion which is shortly to be published are mentioned on page 7 of this BULLETIN.

The Subcommittee on Impact Testing of Committee A-3 on Cast Iron reported the results of its very extensive research work in investigating impact tests. It is believed this special report contains what is probably one of the most comprehensive series of data ever assembled in this country on the physical properties of cast iron.

Because of the growing realization of the importance of statistical method in the interpretation and presentation of data, a session of the annual meeting was devoted to a discussion of this subject. Two interesting papers were presented and there was discussion of the Manual on Presentation of Data prepared by the A.S.T.M. committee on this subject.

There were a number of very interesting papers on new methods of testing, serving as direct evidence that develop-

ments in the testing field continue to be extremely significant.

While the general industrial atmosphere was anything but conducive to holding a successful Regional Meeting during 1933, nevertheless, this meeting held in New York City on March 8 was one of the best yet held. At the sessions in which the Symposium on Motor Lubricants was held, there was an average attendance of about 350. This compares favorably with that at any previous regional meeting. Seven papers were included and the character of the discussions presented is indicative of the value of the symposium.

In addition to this symposium there was another technical session devoted to a discussion of the Industrial Applications of Particle-Size Measurement. This session was also well attended and while it was not found possible to publish the papers, a number have since appeared in technical journals and in this and other ways interest was stimulated in this important subject.

Joint Meetings

During recent years, it has been interesting to note the increased number of sessions and meetings in which other organizations have joined with the Society. At the annual meeting, the session in which the Symposium on Cast Iron was presented was sponsored jointly with the American Foundrymen's Association. The Edgar Marburg Lecture, which is mentioned later, was delivered at a joint meeting with Section M (Engineering), American Association for the Advancement of Science. The Metropolitan Section of the Society of Automotive Engineers cooperated in the development of the program for the regional meeting and joined with the Society in the dinner held subsequently. The Society also participated in a joint meeting of the Econometric Society and the American Society of Mechanical Engineers in a discussion on the theoretical economics in engineering. While these cooperative activities might not be considered as coming within the subject, Society accomplishments, nevertheless they are indicative of the diversity of Society work and the desires on the part of the Society and the other organizations to cooperate to the benefit of the engineering profession.

Standardization Outstanding

It has been mentioned in previous BULLETINS that 1933 was without question one of the most productive years in advancing A.S.T.M. work in the sphere of standardization. At the close of the year there were 689 standard and tentative specifications, methods of test and definitions which had been given A.S.T.M. approval. Of these, 466 have been adopted as standard and the remaining are in the tentative status. Fifty-seven of the standards were adopted in 1933 and 47 proposed specifications and test methods were first published as tentative. The publication of the Book of Standards, while it is of course a normal accomplishment for every third year, nevertheless, should be pointed to as one of the most effective pieces of work carried to a successful conclusion during 1933.

During the year a number of the standing committees have initiated new projects, which are described in a later section of this article.



Edgar Marburg Lecture

The Edgar Marburg Lecture, named in commemoration of the Society's first secretary-treasurer and delivered annually by some leader in the engineering field, brought before the Society in 1933 the first lecturer from abroad. Dr. H. J. Gough, Superintendent of the Engineering Department, National Physical Laboratory, England, discussed in his lecture on "Crystalline Structure in Relation to Failure of Metals—Especially by Fatigue" the extensive experimental work he has been carrying on for over ten years on metallic single crystals, specifically that portion concerned principally with the characteristics of deformation and fracture under mechanical forces. It is recognized as a very important fundamental survey of our present-day knowledge of the nature of solid bodies and is especially timely since little work has been done in this field, atomic physicists having confined their efforts largely to gases. In the lecture Dr. Gough points out—"it is apparent that the deformation characteristics of metals under such diverse straining actions as static, impulsive and repeated stressing are essentially similar and that the behavior of metals during industrial operations can be correlated with the crystalline structure and the deformation forces."

Publications

No review of A.S.T.M. for the past year would be complete without some word regarding its publications. Last year the Society issued a greater volume of published material than in any previous year. These publications represent important data and information for which industry has felt a need and which its representatives in the Society have made a cooperative effort to supply. The work of the committees and inter-society cooperative efforts in correlating from widely scattered sources authoritative data and reliable information on the subjects becomes increasingly important. The distribution of A.S.T.M. books has probably been more widespread in 1933 than in any other year.

Committee Activities

The important developments in committee work and the excellent progress made in many fields of activity are the basis of the remainder of this article. Each year the officers of A.S.T.M. committees summarize their year's work and these statements are incorporated in the following paragraphs. Activities in the various fields are segregated—the work in iron and steel coming first, followed by non-ferrous metals, cement, clay products, concrete, paints, petroleum, textiles, etc., and finally, general testing.

Steel

Committee A-1 on Steel prepared nine new specifications during 1933. Five of these involve materials not previously covered by A.S.T.M. standards—including steel elliptical springs, alloy-steel castings for structural purposes, high tensile strength carbon-steel plates for fusion-welded pressure vessels (one for material 2 in. and under in thickness and a second for plates over 2 in. up to 4 in., inclusive, in thickness), and mild steel plates (suitable for general plate construction). The other four tentative specifications are complete revisions of existing standards covering steel pipe for high-temperature service, steel for bridges and steel for buildings, and carbon-steel castings for industrial, railroad and marine uses. The

latter consolidate and clarify requirements for castings now covered by different specifications. Specifications adopted as standard cover such widely used materials as soft steel track spikes, structural rivet steel, marine boiler steel plate, ship steel, and steel and iron boiler tubes. An important change was formally adopted in the standards for billet-steel and rail-steel concrete reinforcement bars, providing uniform under and over permissible weight variations, depending on the bar thickness.

The special committee, which is studying the possibility of combining into one specification requirements for the necessary grades of rivet steel, has made good progress and hopes to accomplish a great deal in consolidating the specifications and eliminating grades which are nearly the same. A similar activity involves the consolidation of specifications for forgings.

The development of requirements for carbon- and alloy-steel still tubes for refinery services and seamless cold-drawn carbon and alloy heat exchanger and condenser tubes is under way, and it is hoped that at least the first of these may be submitted to the Society this year. A specification for electric-welded tubing has been drawn up and is being studied, as are also specifications for Class I electric-fusion welded pipe.

A very important series of related activities is the writing of specifications for alloy-steel pipe, flanges, fittings and bolts for use at temperatures up to 1100 F.

An extensive revision of the specifications for cold-rolled strip steel has been prepared during the year and will be considered by the committee for submission to the Society.

The Sectional Committee on Standardization of Dimensions and Material of Wrought-Iron and Wrought-Steel Pipe and Tubing, functioning under the procedure of the American Standards Association, has been very active in drawing up recommendations on piping as an American Tentative Standard in conjunction with the Code for Pressure Piping now being developed. This proposed standard covers the entire field of wrought-iron and wrought-steel pipe from the lowest pressure, requiring thin-walled pipe in the larger sizes, to pipe sufficiently heavy for the highest pressure standard now in use, 1500 lb. Since the proposed pipe standard includes detailed information concerning nine A.S.T.M. specifications on pipe, the sectional committee has recommended each of these specifications for approval by the A.S.A.

Wrought, Cast and Malleable Iron

The attention of Committee A-2 on Wrought Iron was directed to improving and harmonizing the chemical and physical requirements of the various specifications for wrought iron products. An increasing demand for iron tanks and fabricated pipe prompted the preparation of specifications for wrought-iron rivets. A brochure on quality standards for wrought iron which will include a correlation of data and information covering physical properties, chemical analysis and structural characteristics is nearing completion.

Committee A-3 on Cast Iron completed two important activities, acting for the Society in sponsoring with the A.F.A., a compilation of valuable engineering data in a Symposium on Cast Iron, and an extensive study of the usefulness and significance of various impact tests for cast iron. The new tentative specifications which classify gray-iron castings in seven classes ranging from 20,000 to 60,000 lb. per sq. in. tensile strength, have been well received during

(Continued on page 10)



The Problem of Short-Cuts and Extrapolations in Determining Load-Carrying Ability of Metals at High Temperatures. Shall It Be Attacked?

THE Joint A.S.T.M.-A.S.M.E. Research Committee on Effect of Temperature on the Properties of Metals discussed at its last meeting a problem that is assuming considerable importance to engineers who design, test, and use alloys at high temperatures.

The logical base for high-temperature design, comparable to the tension test for ordinary temperature design, and, like it, subject to varying factors of safety dependent on the particular type of service, is the stress for a given amount of deformation, determined by tests, each at one constant temperature and one constant load. This requires a family of curves obtained by long-time "creep" tests.

As is usual in the development of a new type of testing, early results were shrouded in uncertainty because it was not clear whether the discrepancies and discordances in the results of different observers were due to inaccuracies in the method of test, such as insufficient realization of the necessity for precise temperature control, too short periods of test, etc., or to real differences in supposedly similar lots of material. Many of the testing difficulties appear to have been overcome by the promulgation last June of a Tentative Creep-Test Code which summarizes in a few essentials of procedure the experience of the committee members and of those of its many subcommittees. It appears that results of different observers, all adhering to the code, will hereafter show vastly better agreement than some of the older data, and that the way is thus paved for true appraisal of the actual differences among materials and, in the case of a single material, of the determination of its load-carrying properties. Determination of the spread in load-carrying ability between different lots of material of the same class, so that the designer can intelligently fix "safe loads"—for which the user is clamoring—must await the accumulation of data on lots of known history.

In most cases design cannot wait for this accumulation, so the designer has to make the best guess he can. He knows that the short-time high-temperature tension test by itself gives high values, which, if they have any real worth at all in design for structures to be subjected to long loading, must be modified by large factors of safety. These must increase, as the temperature is raised, and increase to such large magnitudes that the shakiness of the assumptions made becomes self evident. The designer feels more secure in having creep values, from say 1000 hr. tests, as a basis for extrapolation to the years of actual service he desires, but at best he must still extrapolate. Further, lacking actual data, he must make assumptions as to the conformity of the behavior of the material he uses with available data for behavior of other material of that type that has been previously tested.

Accelerated Testing Methods

Therefore pressure is put on the testing engineer to provide quicker returns when a given lot of material is submitted for high-temperature appraisal. The suggestions for short-cuts have been many. They range from the super-refined determination of short-time proportional limit, through deformation measurements carried on for a day or so, "relaxation" tests starting at high loads automatically reduced, other

tests starting at a high temperature with temperature automatically reduced, through cantilever tests, restrained bend tests, step-up and step-down tests on a single specimen, etc., down to the abandonment of all short cuts and the use of the recognized creep method with the aim of carrying it on only for the period required to show clearly the future behavior of the material. Lack of knowledge on when the test really becomes sufficient makes this aim difficult of fulfillment, especially since the question of metallurgical stability arises, so that another angle of the problem is how to "incite," by shortened methods, metallurgical break-down or stabilization, as the case may be.

Proponents of suggestions for short-cuts normally advocate them primarily for "sighting shots" to reduce the necessary number of creep tests, or for appraisal of the uniformity of a given material from lot to lot rather than as a true foundation for design values, but either the proposer of the short-cut or someone who reads or hears of it ultimately attempts to find some conversion formula by which the short test can be made to tell the long story.

Either some such conversion is possible or none is. Enthusiasm may lead to adoption of an untrue conversion and resulting disaster on the one hand or wasteful use of metal on the other. Conservatism may lead either to excessive cost of testing by sticking to the old ways or to parsimonious failure to make tests where tests are vitally needed, preferring to take chances than to spend money. Progressive engineers have an open-minded attitude toward accelerated methods, but at the same time one that demands engineering proof of, instead of mere hope of, correlation.

Work of Joint Committee

The Joint Committee has, in its ten years of existence, assembled and disseminated much basic information on the relation between high-temperature fatigue and creep, the effect of grain size, etc., and on the broad problem of stability of alloys at high temperature, a metallurgical aspect that must always be considered. The committee has on its immediate program or those of special subcommittees constituted for the purpose of planning, financing and carrying them out, specific problems on specific alloys whose clarification will advance fundamental knowledge.

A similar joint committee recently formed in England for study of high-temperature problems is reported by the British engineering press as in progress of financing, jointly by industry and the government, and on quite an extensive scale, a three-year research program. British editorial comment refers to support of the program as a patriotic duty for the maintenance of British progress against the advances resulting from high-temperature research in other countries. The broadest task of such joint committees is to develop for the evaluation of high-temperature properties acceptable methods which industry may use to get the specific data required on specific alloys as new alloys are suggested for high-temperature service, or to appraise the uniformity from lot to lot of older alloys.

The correlation of long-duration, research-type test methods and rapid-shop or acceptance-test methods was one of the

(Concluded on page 10)



American Society for Testing Materials

BULLETIN

President

T. R. LAWSON

Vice-Presidents

W. H. BASSETT

HERMANN VON SCHRENK

Secretary-Treasurer

C. L. WARWICK

Members of Executive Committee

F. A. BARBOUR

A. C. FIELDNER

C. N. FORREST

H. A. GARDNER

J. O. LEECH

J. T. MACKENZIE

J. C. PEARSON

J. C. RAMAGE

H. S. VASSAR

A. E. WHITE

Past-Presidents

K. G. MACKENZIE

F. O. CLEMENTS

CLOYD M. CHAPMAN

Assistant Treasurer

J. K. RITTENHOUSE

Assistant Secretary

R. E. HESS

Number 66

January 31, 1934

Bulletin

WITH this issue, the A.S.T.M. BULLETIN comes out in a new dress. Coincident with the new cover design are certain changes in the "internal structure." As a rule, changes are not justified unless certain advantages accrue. The cover has a modern note, yet its tone seems in keeping with A.S.T.M. and its work. Minor changes in text typography are believed to facilitate readability and to harmonize with the cover.

Studies which have been made of the BULLETIN and its scope may in time result in some enlargement, with possibly a greater number of issues to be published. For the present, it will continue to give the members news of current A.S.T.M. activities with notes on other work of interest along lines of research and standardization in engineering materials. Six numbers will appear in 1934.

Comments, suggestions and criticism of the BULLETIN from the members are invited.

An Ending and a Beginning

ALL of the members and many of the friends of the Society may be interested in learning just how A.S.T.M. fared during 1933—specifically from the financial and membership standpoints. A few facts and figures will give a general idea. It is planned to include a more detailed statement on the financial operations in a future issue of the BULLETIN.

The Society closed its books December 31 on the right side of the ledger. That a favorable balance of about \$2700 is shown, resulted from such contributing factors as lower printing costs, decreased administrative expenses and economies in general office expenditures. All these economies were made without affecting in any way A.S.T.M. technical publications or other services which accrue from a Society membership. The assets of A.S.T.M. membership still continue as high as ever.



BULLETIN
January, 1934

The membership picture is not quite so heartening—but even here, there is no cause for despondency. Despite industrial conditions, 197 new members were enrolled in 1933. That figure is considerably less than for any of the years 1927 to 1931, but it is highly significant of what the membership future should be, with more and better signs of increased industrial activity.

All this is "water over the dam." But what is the outlook for 1934? Financial status—good. Can undoubtedly be improved. Technically—committees have a host of projects in progress; papers and reports to be presented leave no worry on this phase of promoting knowledge of materials. Membership—there are many prospective A.S.T.M. members to be shown why they should become a part of the Society. This means the developing of machinery through the Special Committee on Membership to intensify our efforts.

The future then is fraught with potent possibilities. Anybody can predict that. Two years ago then-President Clements suggested that it was very much in order to don fighting clothes. That so many loyal A.S.T.M. members did so is the foundation for the Society's continued progress. These clothes are needed now as then and only by consistent, sustained "plugging" can the future's potent possibilities be turned in A.S.T.M. favor.

President Lawson Says —

The review of the Society's activities for the year, as given in this BULLETIN, shows that, notwithstanding the depression, more has been accomplished than in any preceding year. This has been made possible only by most careful management and the loyal support of the members, officers and the headquarters staff. Appropriations have been cut all along the line to offset partially the loss of revenue from members who have been unable to keep up their dues, but this has neither lessened the efficiency in administering Society affairs, nor affected interest in the work. Such loyal service deserves commendation.

With better times in prospect and the added incentive of working under improved conditions in our new Society rooms, the outlook for the coming year is bright. While much can be done by the headquarters staff, yet, after all, it can do but little without material and data being furnished through the membership and committees.

May we therefore urge active participation not only in the coming 1934 Regional Meeting at Washington in March, but also in the committee work of the Society as well as the endeavor to greatly increase our membership.

J. R. Lawson

President, 1933-1934

Symposium in Cloth Binding

A number of the members have expressed a desire that the Symposium on Cast Iron which was published in separate form in addition to its inclusion in the 1933 *Proceedings* be made available in cloth binding. A supply of these books was therefore bound in cloth and anyone who wishes to have a copy in this type of binding can now obtain it. The price of a cloth-bound copy is \$1.25, while the symposium bound in heavy paper cover is listed at \$1 per copy.

Schedule of Committee Meetings

DATE	COMMITTEE	PLACE
Week of		
February 12	C-8 on Refractories	Cincinnati, Ohio
February 19-20	B-4 on Electrical-Heating, Electrical - Resistance and Electric-Furnace Alloys	New York City
February 21	B-6 on Die Cast Metals and Alloys	New York City
February 22	Joint Committee on Pig Iron Qualities	New York City
February 22	M-20 Sectional Committee on Classification of Coals	New York City
February 26	E-6 on Papers and Publications	Philadelphia
March 5-9	SPRING GROUP MEETINGS OF COMMITTEES	Washington, D. C.
March 15-16	D-9 on Electrical Insulating Materials	Philadelphia
Week of		
March 26	D-1 on Preservative Coatings	St. Petersburg, Fla.
	D-17 on Naval Stores	St. Petersburg, Fla.
April 10	Executive Committee	Philadelphia

Report on Tests of Concrete Soon Available

Work is now in progress on the publication of the Report on Significance of Tests of Concrete and Concrete Aggregates, assembled under the auspices of Committee C-9 during the past year and presented at the Thirty-sixth Annual Meeting. The purpose of this compilation is to present an effective summation of the significance, limitations and applicability of the more widely used tests for concrete and concrete aggregates, including discussions of their importance, whether they convey a true picture of what can be expected and other pertinent factors.

The respective sections of the report, each dealing with particular tests, were prepared by members of Committee C-9, each of whom is an authority in his field. The material was compiled under the direction of a committee consisting of R. W. Crum, chairman, A. T. Goldbeck and F. H. Jackson, and was reviewed by the entire membership of Committee C-9, which approved it.

It was found impossible to preprint the report and include it in the *Proceedings*, but it will be issued as a separate publication, available about March 15. Each member may obtain a copy on request, using the card enclosed with this BULLETIN. Extra copies can be purchased at \$1 each.

Papers for 1934 Annual Meeting

While there is still ample time for members and others who have in mind submitting technical papers for presentation at the 1934 annual meeting to forward their offers to Committee E-6 on Papers and Publications, the committee will appreciate having the required information as far in advance of the limiting date for receipt of offers, February 23, as possible. All offers of papers must be accompanied by a summary which should make clear the intended scope and point out features that in the opinion of the author will justify its acceptance for presentation and discussion. The Committee on Papers will meet soon after February 23 and consider all offers before it.

New Society Rooms Officially Opened

While there was no cutting of ribbons, as is the custom in officially opening a new bridge, or breaking of the customary bottle which accompanies official launching of vessels, nevertheless the new Society rooms at 260 S. Broad Street, Philadelphia, were very appropriately dedicated at the Open House, held on Monday evening, January 29. A goodly number of members and guests took the opportunity to inspect the new rooms, fraternize with the officers and fellow members and get first-hand knowledge of office procedure and internal mechanism. Cordiality and good fellowship pervaded the rooms, and this spirit of good will adequately served as a dedicatory medium.

Those who took part in the Open House expressed the hope that all of the members of the Society may have an opportunity of inspecting the new A.S.T.M. rooms in the near future. The Members Room is comfortably appointed, with writing desk, telephone, current journals, etc., and many members visiting Philadelphia may find this room convenient for various purposes.

"Acquisition of Data" Paper Available

One of the informal papers presented at the 1932 annual meeting in the session devoted to a discussion of Acquisition of Good Data was entitled "Criteria for Rejection of Observations" by Dr. Paul Rider, Washington University. This extensive paper which presents a very comprehensive survey of the work done in this field has recently been published by the university and the Society has obtained a limited supply. Members who may be interested in this subject can obtain copies at 50 cents each from Society headquarters.

Test Issued for Gum in Gasoline

A new Tentative Method of Test for Determining Gum Content of Gasoline has been approved for publication by Committee E-10 on Standards, on the recommendation of Committee D-2 on Petroleum Products and Lubricants, which developed the method. Its serial designation is D 381-34 T. It is based on an extensive cooperative test program and studies of various procedures used and it is believed will give reproducible results.

Each member of the Society may obtain without charge a copy of this new tentative standard by using the coupon below. Copies also may be purchased at 25 cents each, or at considerably lower prices in quantity.

American Society for Testing Materials
260 S. Broad Street
Philadelphia

Gentlemen:

Kindly send me a copy of the Tentative Method of Test for Determining Gum Content of Gasoline (D 381-34 T).

MEMBER.....

ADDRESS.....

New Members to January 25, 1934

The following 36 members were elected from December 1, 1933, to January 25, 1934:

Company Members (3)

NATIONAL ASSOCIATION OF LUBRICATING GREASE MANUFACTURERS, INC., Guy Peters, Secretary, 3330 Beekman St., Cincinnati, Ohio.
SEIBERLING RUBBER CO., C. A. Carlton, Development Manager, Akron, Ohio.

TATA IRON AND STEEL CO., LTD., THE, J. L. Keenan, General Manager, Jamshedpur (via Tatangar & B. N. Ry.), India.

Individual and Other Members (31)

AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS, Raymond Olney, Secretary-Treasurer, St. Joseph, Mich.

ANTIOCH COLLEGE LIBRARY, Yellow Springs, Ohio.

AYERS, E. B., Chief Chemist, Shell Petroleum Corp., East Chicago, Ind.

BRUST, A. W., Assistant Professor of Civil Engineering, Box 83, Washington University, St. Louis, Mo.

BUTLER, R. A., Technical Superintendent, Martha Mills, Thomaston, Ga.

CHEF DU SERVICE TECHNIQUE DES CONSTRUCTIONS NAVALES, Marine Nationale Francaise, 8 Boulevard Victor, Paris 15^e, France.

COLEMAN, J. H., City Engineer, City Hall, Greenwood, S. C.

DALLAS, CITY OF, Public Works Dept., O. H. Koch, Director of Public Works, Dallas, Tex.

GROSVENOR, W. M., President, William M. Grosvenor Laboratories, Inc., 50 E. Forty-first St., New York City.

HARDEN, H. H., The Arco Co., 7301 Bessemer Ave., Cleveland, Ohio.

ISENBURGER, H. R., President, St. John X-ray Service, Inc., 30-20 Thomson Ave., Long Island City, N. Y.

KASPER, W. F., Vice-President, Fairmont Railway Motors, Inc., Fairmont, Minn.

LAGERSON, K. B., Assistant Engineer, De Laval Steam Turbine Co., Trenton, N. J.

NADAI, A., Westinghouse Research Laboratories, Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa. For mail: 113 Cherry Valley Road, Wilkinsburg, Pittsburgh, Pa.

NOWELS, K. B., Chief Petroleum Engineer, Forest Oil Corp., 78 Main St., Bradford, Pa.

POWERS, F. T., Vice-President, Powers X-ray Products, Inc., New St., Glen Cove, N. Y.

RABBITT, J. A., Japan Nickel Information Bureau, The International Nickel Co. of Canada, Ltd., Municipal Research Bldg., Hibiya Park, Tokio, Japan.

ROBERTS, J. M., Secretary and Treasurer, Scientific Apparatus Makers of America, Room 3014, 20 N. Wacker Drive, Chicago, Ill.

SCHLISSEL, M. M., Chief Chemist, Metropolitan Refining Co., Inc., 23-28 Fiftieth Ave., Long Island City, N. Y.

SHEARER, H. L., Chief Engineer, Central Rock Co., 314 McDowell Road, Lexington, Ky.

SHNIDMAN, LOUIS, Laboratory Director, Rochester Gas and Electric Corp., 89 East Ave., Rochester, N. Y.

SISLER, SAMUEL, Deputy Surveyor, The Cuyahoga County Testing Laboratory, 2030 W. Nineteenth St., Cleveland, Ohio.

SMITH, DuRAY, General Manager, Union Spring and Mfg. Co., New Kensington, Pa.

STOTT, A. J., Director, James Stott Limited, Werneth Mills, Oldham, Lancashire, England.

UNIVERSITY OF ILLINOIS LIBRARY, Urbana, Ill.

VAN HORN, K. R., Research Metallurgist, Metallurgical Division, Aluminum Research Laboratories, Aluminum Co. of America, 2210 Harvard Ave., Cleveland, Ohio.

VAN ZILE, B. S., Chemist, Colgate-Palmolive-Peet Co., 105 Hudson St., Jersey City, N. J.

VICKERS, G. W., General Manager, The Sheffield Testing Works, Ltd., Blonk St., Sheffield, England.

WELD, D. P., Supervisor, Research and Development Division, General Laboratories, Socony-Vacuum Corp., Paulsboro, N. J.

WRIGHT, R. E., 497 West Grandview, Sierra Madre, Calif.

ZUSCHLAG, THEODOR, Chief Electrical Engineer, Magnetic Analysis Corp., 42-44 Twelfth St., Long Island City, N. Y.

Junior Members (2)

BAMBERGER, S. F., 925 Harding Ave., Venice, Calif.

VOSE, R. W., Assistant in Testing Materials, Massachusetts Institute of Technology, Cambridge, Mass.

Personals

News items concerning the activities of our members will be welcomed for inclusion in this column.

F. M. FARMER, Past-President, A.S.T.M., Vice-President and Chief Engineer, Electrical Testing Laboratories, has been elected Vice-Chairman of the Standards Council of the American Standards Association. Mr. Farmer is one of the Society representatives in the A.S.A. He has also been nominated as one of the Directors of the American Institute of Electrical Engineers.

F. M. ROBBINS, since 1918 Vice-President of Ross-Meehan Foundries, Chattanooga, Tenn., has been elected President, succeeding the late G. F. MEEHAN.

H. W. McQUAID, formerly with the Timken-Detroit Axle Co., is now metallurgist, Republic Steel Corp., Detroit, Mich. He will devote his time to research and development work.

F. E. TURNEAURE, Dean, College of Mechanics and Engineering, University of Wisconsin, has received a signal distinction in being elected to honorary membership in the American Society of Civil Engineers. Dean Turneure was a member of the A.S.T.M. Executive Committee, 1916-1918.

HARRISON P. EDDY, Consulting Engineer, Boston, Mass., was elected President of the American Society of Civil Engineers at its recent meeting in New York City. At the same time, several other members of the A.S.T.M. were elected to offices in the A.S.C.E. including H. D. DEWELL, Vice-President, and the following Directors: F. A. BARBOUR, T. E. STANTON, JR., T. J. WILKERSON and O. H. AMMANN.

R. E. HALL, Director, Hall Laboratories, Inc., Pittsburgh, Pa., has been selected as the recipient of the 1933 Pittsburgh Award in recognition of his distinguished service to chemistry and humanity, particularly his contributions to the fundamental knowledge of boiler-water reactions. This award, established by the Pittsburgh Section, American Chemical Society, symbolizes the honor and appreciation accorded those who have rendered distinguished service to chemistry in the Pittsburgh area.

JOHN F. COLEMAN, Consulting Engineer, New Orleans, has been elected President of the American Engineering Council, which has its headquarters in Washington, D. C.

THADDEUS MERRIMAN, Chief Engineer of the Board of Water Supply of the City of New York, has retired from active service with the Board. His service began in 1905 and since the retirement of the late J. Waldo Smith in 1922, Mr. Merriman has been chief engineer.

JAMES R. WITHROW, Professor of Chemical Engineering at Ohio State University, was recently elected a Director and member of the Council of the American Institute of Chemical Engineers.

H. F. HEDDERICH, formerly Chemical Engineer, Westinghouse Electric & Mfg. Co., Indianapolis, Ind., has become Superintendent of Physical Laboratory, State Highway Commission of Indiana, Indianapolis.

Appointments

The appointment of the following Society representatives is announced:

A. C. FIELDNER, Chief Engineer, Experiment Stations Division, U. S. Bureau of Mines, as the American representative on Committee 27 on Coal, of the International Standards Association.

K. G. MACKENZIE, Consulting Chemist, The Texas Company, reappointed as the Society's representative on the Lubricants Division of the Society of Automotive Engineers.

W. H. BASSETT, Metallurgical Manager, The American Brass Co.; C. H. MATHEWSON, Prof. of Metallurgy, Sheffield Scientific School, Yale University; D. L. COLWELL, Sales Manager, Stewart Die-Casting Corp., and J. B. JOHNSON, Chief, Material Section, Materiel Division, Air Corps, U. S. A., to represent A.S.T.M. Committees B-2, B-5, B-6 and B-7, respectively, on the Non-Ferrous Metals Division of the Society of Automotive Engineers.

F. E. BASH, Manager, Technical Department, Driver-Harris Co., has been elected to membership on the Joint Research Committee on Effect of Temperature on the Properties of Metals, under the joint auspices of A.S.T.M. and A.S.M.E.



Archibald Alston Stevenson

1862 - 1933

IN THE death on December 15, 1933, of Archibald Alston Stevenson, Past-President and Honorary Member, the Society has lost a leader who was an outstanding figure in its history, admired and esteemed by his fellow members for the able, vigorous, inspiring and kindly man that he was. To him the Society owes much for the success that has attended the development of many of its specifications for steel; indeed, the Society will for all time be indebted to him for his wise counsel and able leadership extending from the very earliest days of its history down to his last hours. The A.S.T.M. was very near and dear to him; he gave constantly and generously of his time and his talent to advancing its aims and activities, and maintaining the high ideals conceived for the Society by its founders.

He passed away after an illness of several months, during which he fought with cheerful courage against heavy odds. His widow, daughter and a brother survive.

Mr. Stevenson's entire life was spent in the iron and steel industry. He was born April 10, 1862, at Allegheny, Pa., now part of Pittsburgh, and was educated in the schools of Pittsburgh and Rock Island, Ill., and at the University of Illinois. After seven years with the Southwark Foundry and Machine Co. and the Cambria Iron and Steel Co., he entered the employ of the Standard Steel Works Co. on August 1, 1888, and was with this company until he retired on July 1, 1929—a notable period of service extending over forty-one years. He was, successively, traveling engineer, manager of wheel department, engineer, assistant superintendent, superintendent, vice-president and engineer, and from 1920 vice-president in charge of manufacture. He was greatly interested in the technologic advance of his industry and was associated with some notable developments, among them being the design of one of the first commercial heat treatment furnaces in the country, the application of the etching of steel tires as regular works practice and the early use of the microscope for research in the steel industry.

During the World War he was actively associated with the cooperative efforts between the steel industry and the Government in the production of forgings for large caliber guns.

Stevenson was always deeply interested in establishing standard specifications for steel products equitable alike to user and producer, and to this task he brought remarkable ability to deal with the human side of such work, supported and guided by a high degree of technical understanding. It was here in our own Society that this ability was brought most effectively to fruition. A member from the first beginnings in 1896, he participated actively in the affairs of the Committee on Steel, for two years as vice-chairman; he was for many years chairman of its subcommittee on

Wheels and Tires and for several years chairman of its subcommittee on Forgings. He had great influence in these committees because everyone recognized his absolute fairness in dealing with controversial questions. He sought earnestly and effectively to understand conflicting viewpoints and to find a common meeting ground, and he helped immeasurably to establish the cooperation between producer and consumer that is one of the corner stones of the Society.

The Society soon called upon him for service in executive and administrative work. He was a member of the Executive Committee from 1911 until 1920, serving as Vice-President in 1914-1916 and President in 1916-1917. He was the first president of the Society chosen from the producer ranks—a truly merited recognition of those qualities that drew everyone to him, and an honor that he prized highly. In 1927, at the twenty-fifth annual meeting of the Society, he was made an Honorary Member.

Stevenson's appointment in 1916 as one of three Society representatives on a committee to consider the coordination of standardization activities of the leading engineering societies provided opportunity for one of the outstanding accomplishments of his life. Out of the deliberations of this committee there was established in 1918 the American Engineering Standards Committee (now the American Standards Association), upon which he served continuously as a Society representative till his death. He was chairman in 1920 and 1921 and did much in the trying early days of the Committee's existence to guide it safely through many difficulties and place it upon firm ground. He was also greatly interested in the work of the Division of Simplified Practice of the Department of Commerce, serving as a

member and later chairman of its Planning Committee.

Mr. Stevenson was a member of the American Society of Mechanical Engineers, American Institute of Mining and Metallurgical Engineers, American Iron and Steel Institute, American Society for Steel Treating and a Past-President of the Association of American Steel Manufacturers. He was a member of the Union League of Philadelphia, the Engineers' Clubs of Philadelphia and of New York, and the Saint Andrews Society.

A life of distinguished service has ended, leaving its indelible impress upon all who were touched by it. The officers and members of the Society mourn his passing and extend their heartfelt sympathies to his family. But they will cherish the years of association with him and the memory of his kindly, lovable personality and his keen and friendly interest in his fellow workers. Remembering the outstanding things he accomplished for the Society that meant so much to him, let us ever strive to build it nearer to the ideals he so dearly cherished.



Blank & Stoller, Inc.

A. A. STEVENSON



High-Temperature Research

(Continued from page 5)

original purposes for which the American Joint Committee was formed and which has had constant consideration in its councils. Until recently, the creep determination itself was hardly on a firm enough foundation to serve as a useful base for the comparison. Today it seems, while still subject to improvement and still calling for experience and engineering judgment in its application, usable as a base.

Three-Year Correlated Research Planned

The committee is therefore suggesting that a correlation program should be undertaken wherein, as a minimum, one ferritic and one austenitic steel, each most carefully chosen for metallurgical uniformity and stability, would be subjected to creep determinations, at a temperature in each case chosen in view of the recognized uses for such materials at those temperatures, and at three loads, chosen to produce creep rates of the order considered allowable in industrial use. These creep tests would continue for *three years* and be made under the Tentative Creep-Test Code.

Meanwhile, the same materials would be subjected to the various accelerated or short-cut methods that have been proposed, and various methods of extrapolation from one load to another that have been suggested, would be applied. From these methods the rate of creep for three years would be predicted according to the procedure used by the proponents of each method, and later compared with the actual results of the three-year test. Material would be held for use in other short-cut methods that may arise later, and for possible international comparisons of methods.

Instead of waiting for comparisons of each short method with regular creep to be made upon whatever materials the experimenter has available, *simultaneous* correlation would thus be obtained on the *same* materials.

Obviously, such a program would involve considerable expense (though the committee already has the promises of many of its own members for cooperation in the program), and the minimum program outlined above could not be started without assurance of sufficient interest and support to make its completion certain.

Comments Requested

Designers and users, such as the power plant, oil, and furnace industries, as well as producers, of alloys for high-temperature equipment, are therefore invited to inform the Secretary of the Joint Committee, Mr. N. L. Mochel, Westinghouse Electric and Manufacturing Co., Lester Station, Philadelphia, Pa., whether they would like to see such a correlation program taken up by the Joint Committee. The committee desires to be as responsive to the wishes of the interested engineering industries as possible.

While its own membership feels that the project outlined should be undertaken at the earliest feasible moment, before committing itself to a "three-year plan," it seeks comment and guidance on the selection of this or alternate activities that may be deemed more pressing by the engineering world. *The Committee will not assume, in the absence of either adverse or favorable comment that "silence gives consent."* Should the program not be sufficiently welcome to the industries concerned so that a definite desire for its pursuit is registered with the committee, the project will not go forward. Comments are therefore earnestly requested, whether pro or con.



BULLETIN
January, 1934

Work of A.S.T.M. in 1933

(Continued from page 4)

the year. They are continued as tentative pending completion of a test program which will furnish additional data on tension and transverse tests, sizes and methods of making test bars.

Consideration is being given by Committee A-7 on Malleable Iron Castings to specifications for castings suitable for pipe fittings, valves and valve parts. The question of a proper definition for malleable iron, occasioned by the development of special types of castings produced by the malleable process but not falling completely within the generally accepted definition of malleable iron castings, has recently been undertaken.

Heat Treatment and Magnetic Testing

A new definition for "nitriding" and revised definitions for "heat treatment," "annealing," "normalizing" and "tempering," prepared by a Joint Committee of representatives of the American Society for Steel Treating, the Society of Automotive Engineers and the A.S.T.M. were adopted as standard on the recommendation of Committee A-4 on Heat Treatment of Iron and Steel. The Joint Committee is now considering a new term to be known as "full tempering" to apply to cast steel products.

Based upon its experimental studies, Committee A-6 on Magnetic Properties has completely revised the procedures for the testing of magnetic materials. The standard now includes procedures for testing at low inductions with alternating current in addition to tests for normal induction and hysteresis and for core loss.

Corrosion of Iron, Steel and Non-Ferrous Metals

Committee A-5 on Corrosion of Iron and Steel is continuing various important field tests of uncoated and metallic coated ferrous metals exposed to the atmosphere and to salt water. They are all now at important and instructive stages. The uncoated black sheets under mild atmospheric exposure are showing a number of failures at each inspection.

Tests of corrugated, galvanized sheets at Altoona, Pittsburgh, Sandy Hook, State College and Key West have been in progress for over 7 years. Practically all the galvanized sheets have rusted at Altoona and Pittsburgh; rusting is in progress at Sandy Hook and is just beginning at State College on the lightest coatings.

At the same five locations there are exposed specimens of hardware, structural shapes, tubular goods, etc., carrying zinc finishes applied by four processes, also cadmium, lead and aluminum coatings. The principal conclusion which the committee has reached after periodic inspections following four years exposure is that the protection afforded by a zinc coating depends on the location and is almost directly a function of the weight of coating. It is hoped soon to start a corrosion test program on galvanized wire materials.

Exposure tests at six locations on electrodeposited coatings, which include specimens finished with nickel, chromium, zinc and cadmium of various thicknesses, have been in progress for over a year. A report of developments in this test program is in preparation.

Four specifications for galvanized iron and steel wire and wire products were adopted as standard. The present grades of farm fence and barb wire are not satisfactory and

will receive further study. Various individuals and organizations of the agricultural group are showing lively interest in this work.

In the sea water immersion tests on copper-bearing and non-copper-bearing metals at Key West, Fla., and Portsmouth, N. H., all of the No. 22 gage sheets have failed. Conclusion will not be drawn until completion of tests on the No. 16 gage sheets. A number of improvements, based on present practice, were made in the standard methods of determining weight and uniformity of coating on zinc-coated (galvanized) iron or steel articles. Studies are being made of industrial atmospheric laboratory tests.

Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel and Related Alloys has reported the results of cooperative laboratory studies of four stainless steels using the salt spray test, the boiling nitric acid test and the copper sulfate stain test. The report includes detailed descriptions of the apparatus and test methods, chemical analysis of alloys studied, and a critical discussion of the test data. The results seem to indicate that neither the salt spray test nor the copper sulfate stain test may be considered as quantitative, nor its results reproducible in the same or different laboratories, while the boiling nitric acid test is capable of furnishing accurate, reproducible, quantitative data. Data sheets covering chemical, physical, mechanical and fabricating properties of the plain iron-chromium alloys together with information on successful spheres of application of these alloys are in the course of preparation.

Committee B-3 on Corrosion of Non-Ferrous Metals and Alloys has presented a valuable progress report on the corrosion resistance of 24 non-ferrous metals and alloys after one year's exposure at nine test locations representing as many important types of atmospheric conditions. The changes in weight, tensile strength, and elongation that the materials have undergone since exposure have been recorded. A visual examination of the character and amount of the corrosion product films formed was also noted. The changes in physical properties of the exposed specimens are compared with results on sets of similar specimens stored in sealed containers over soda lime in order to determine the effects due to corrosion and those resulting from aging. Subsequent examinations of these tests over the next ten years will be made. Studies are also being made of the corrosion of these same alloys immersed in solutions of sulfuric acid, hydrochloric acid, caustic soda and common salt solution. The first inspection after one year's exposure of the galvanic and electrolytic couples of the metals in common use and of the couples immersed in hot water, brine, alkali and acid have been made and the data are now being prepared and studied for presentation in the 1934 report.

The Sectional Committee on Specifications for Zinc Coating of Iron and Steel, completed specifications for zinc coating (hot-dip) on hardware and fastenings which were submitted to and accepted by the A.S.T.M. for publication as tentative. The committee also recommended to the Society revisions in the standard specifications for zinc (hot-galvanized) coatings on structural steel shapes, plates and bars and their products which resulted from the embrittlement investigation of Committee A-5.

Non-Ferrous Metals and Alloys

Important activities undertaken during the year by Committee B-2 on Non-Ferrous Metals and Alloys include specifications and chemical methods for pig tin, specifications

for coated metals, particularly lead-coated copper, critical examination of several analytical methods for copper alloys, and also a revision of the pig lead specifications. A subcommittee is initiating work on the precious metal alloys used in the jewelry industry, primarily to develop standard methods of sampling and the erection of standards of purity.

A specification for the special high-grade zinc, known as 99.99 per cent, suitable for certain die castings and other uses, was adopted as standard. Improved and shorter methods for chemical analysis of aluminum and its alloys were issued.

The more severe service required of white metal bearings due to higher compression and increasing speed of automobile motors has made necessary improvements in these bearing alloys. A cadmium-nickel alloy (3 per cent cadmium, balance nickel) superior in compression and hardness at temperatures up to 570 F. to the tin-base babbitts is reported by C. E. Swartz and A. J. Phillips in a paper on "A Comparison of Certain White-Metal Bearing Alloys, Particularly at Elevated Temperatures." J. N. Kenyon reported studies on "The Effect of the Addition of Lead on the Hardness of Certain Tin-Base Bearing Alloys at Elevated Temperatures."

This research work and other investigations at the U. S. Bureau of Standards, Columbia University and elsewhere are furnishing valuable data for a revision of the existing standard specifications for babbitt metals.

Copper Alloys

On the recommendation of Committee B-5 on Copper and Copper Alloys a number of important revisions were made in standard specifications for copper plates, bars, tubes and pipe. The brass pipe specifications were enlarged to include admiralty metal and red brass in addition to muntz metal and high brass formerly covered. The copper water tube and seamless copper tubing specifications were adopted as standard. Specifications are in preparation for copper-silicon alloys, wrought copper alloy bearing plates and sheet copper for roofing purposes.

A continuation of research work on copper-base alloys at the Bureau of Standards was reported by H. B. Gardner and C. M. Saeger, Jr., in a paper on "The Effect of Sulfur and Iron on the Physical Properties of Cast Red Brass (85 Cu, 5 Sn, 5 Zn, 5 Pb)."

Die Castings

An important contribution by Committee B-6 on Die-Cast Metals and Alloys was a specification for a new hard zinc die-casting alloy having a high impact strength under severe and varied conditions of aging and excellent resistance to oxidation. In revising the aluminum-base alloy No. XII, the committee took cognizance of the fact that in general commercial practice the copper, silicon and zinc contents approximate more closely the new limits and that this alloy is essentially a competitive composition without specified physical or corrosion-resistant properties.

Committee B-6 is following closely the developments of other die-casting alloys and has just organized a new subcommittee on magnesium-base die-casting alloys.

Electrical-Resistance Alloys

Committee B-4 on Electrical-Heating, Electrical-Resistance and Electric-Furnace Alloys has continued its work on the accelerated life test for electrical heater wire. This test and



the thermoelectric power test were adopted as standard. The effect of the frequency of cooling upon the life of a heating unit is being studied to determine the relation between the life of a wire in practically continuous operation as compared with one which is cooled according to the cycles now specified in the life test. A comparison of the present methods of determining temperature coefficient of electrical resistance of sheet manganin is being made in order to develop a standard method. The development of a standard method of test for the thermoelectromotive force of thermocouple materials is under consideration.

A new tension-test specimen for determining the tensile strength of alloys at temperatures up to 1000 C. is under consideration in cooperation with the Joint Committee on Effect of Temperature on the Properties of Metals. Committee B-4 cooperated with the Joint Committee in developing the short-time high-temperature tension test issued this year. A method of test for the linear expansion of metals at high temperatures has been developed. A fundamental study of thermostatic metals is under way.

Light Metals

Due to the rapid advance in the art of manufacturing aluminum and its alloys, many of the specifications under the jurisdiction of Committee B-7 became obsolete. The specifications for aluminum sheet and plate, aluminum-base sand-cast alloys, aluminum alloy (duralumin) sheet and plate, aluminum alloy rods, bars and shapes have accordingly been revised, and a new specification prepared for magnesium ingot and stick for remelting. A comprehensive report on the service characteristics of light metals and alloys and methods of protection against corrosion is in preparation.

Studies by E. H. Dix, Jr., on "Corrosion Resistance of Structural Aluminum" show that corrosion of aluminum becomes less serious as the thickness increases.

Fatigue

Three papers on the subject of fatigue, in addition to the Edgar Marburg Lecture, by Doctor Gough, were also presented. In describing "The Fatigue Properties of Light Metals and Alloys," R. S. Templin contributed extensive fatigue data on many commercial light aluminum alloys, and for several magnesium-base alloys as well as a discussion of the relation between endurance limit and tensile strength.

H. F. Moore and H. B. Wishart, in a paper on "An 'Overnight' Test for Determining Endurance Limit," described an accelerated fatigue test in which five or six specimens of known Rockwell hardness are each subjected to about 1,400,000 cycles of stress, requiring 15½ hours at 1500 r.p.m. in rotating-beam machines. The theory of the overnight test is that below the endurance limit repeated flexure increases the tensile strength by cold work, while above the endurance limit cracks develop that reduce the tensile strength. S. M. Shelton and W. H. Swanger described "Fatigue Tests of Galvanized Wire Under Pulsating Tensile Stress," which are believed to give a good indication of performance in service.

Effect of Temperature on Metals

The Joint A.S.M.E.-A.S.T.M. Research Committee on Effect of Temperature on the Properties of Metals, after extensive research and development studies, formulated short-time and long-time (creep) high-temperature tension

tests for metals covering a range from room temperature up to 2000 F.

A new subcommittee, comprising representatives of the American Petroleum Institute, Association of American Steel Manufacturers and the Joint Committee, has been organized to consider problems relating to high-temperature applications of metals in oil refineries.

A report on the high-temperature creep and fatigue properties of cast and wrought high- and low-carbon 18 per cent chromium, 8 per cent nickel steel from split heats, was presented at the annual meeting of the A.S.M.E. in December.

C. R. Austin and J. R. Gier described "Studies on a Modification of the Rohn Test for Investigating Creep of Metals," as a rapid means of classifying alloys according to their metallurgical behavior and probable use at high temperatures.

Metallography

Committee E-4 on Metallography completed in the early spring the grain-size chart for classification of steels and this was adopted as standard at the annual meeting. It is now proposed to continue work somewhat along the same lines in the field of tool steels. The possibility of a recommended practice for dilatometric analysis is also under consideration.

Definite progress has been made on the revision of the metallographic test methods. A preliminary report on metallographic standards for iron and steel has been prepared and circulated in the committee. This report is very comprehensive and will be incorporated in the revised methods which will apply to both ferrous and non-ferrous metals. A new lens has been designed for use with ultra-violet rays. With the proper filter the image is focused by means of the green visible rays, and this filter is replaced by one which lets through only the ultra-violet ray of the 3650 Ångström mercury line.

Cement

Another series of plastic mortar compression tests has been made by Committee C-1 on Cement, using twelve cements. A report, including tests up to six months, was also compiled on the effect of varying SO₃ content on cements for low, medium and high tricalcium aluminate.

A study of methods of chemical analysis was undertaken and ten laboratories are now cooperating in a comparative study of certain methods. The subject of sub-sieve particle size continued to be of much interest, and a second series of cooperative sub-sieve fineness tests is being carried out. Work is also progressing in the studies of volume change and soundness of portland cement, time of setting, blended cements, plasticity, low-heat cements, and high-early-strength cements.

Mr. P. H. Bates, in a paper on "Status of Specifications for Hydraulic Cements in the United States," discussed conditions under which cements are used. He questioned the possibility of any single type of cement being able to meet satisfactorily the numerous service conditions in such structures as a dam, a reinforced-concrete building and a road. He proposed separate cements for particular applications which should exhibit, respectively, qualities of high-early strength, plasticity, low heat of hardening, low volume change and resistance to moisture and aggressive solutions; also two cements similar to the standard portland, one being lower in lime and higher in silica than the other.



A number of important developments on various phases of the cement and concrete research studies being carried on in connection with the Boulder Dam project were reported in several papers. Studies by R. W. Carlson and G. E. Troxell on "The Effect of Adding Siliceous Material to Portland Cements upon Volume Changes, Compressive Strength and Heat Generation," throw some light on the advantages derived from blending portland cement with a volcanic ash.

Brick and Refractories

Important changes made by Committee C-3 on Brick in the specifications for concrete building brick brought these more in line with other brick standards. A revision of the sewer brick specifications is under consideration, particularly the absorption test. Consideration is being given to definitions of solid brick and cored or hollow brick.

An extensive survey of building brick representing 37 per cent of the production in this country was reported by J. W. McBurney and C. E. Lovewell in a paper on "Strength, Water Absorption and Weather Resistance of Building Bricks Produced in the United States."

The action of reinforced brick beams was shown by M. O. Withey in a paper on "Tests on Brick Masonry Beams," reporting studies on 8 by 12-in. beams, 8 ft. span, using three varieties of brick, longitudinal and stirrup reinforcement.

An interesting theory regarding the formation of a "bond layer" to prevent water penetration through brick masonry was advanced by W. C. Voss in his paper on "Permeability of Brick Masonry Walls—an Hypothesis."

In view of the increasing use of insulating refractories, Committee C-8 on Refractories prepared tentative methods for determining compressive strength, flexural strength and shrinkage of these high-temperature heat-insulating materials. Improvements were made in the tests for softening point, porosity and volume changes and the spalling test.

The so-called panel spalling test for determining the resistance of refractory brick to thermal and structural spalling has been tentatively adopted. This more nearly simulates service conditions and will replace the old water dip test which failed to predict just how a fire brick would perform in service.

Committee C-8 is preparing tests and specifications for refractory insulation and some definite data on this subject will soon be ready for publication. A new method for the chemical analysis of magnesite refractories has been approved and a critical study is being made of practically all the refractory tests.

Pipe and Drain Tile

The Committee on Clay Pipe made a number of important improvements in the tentative specifications for clay sewer pipe issued last year to replace the existing standard. An extensive review of the standard definitions for sewer pipe and the recommended practice for laying sewer pipe has been undertaken by the committee.

Results of two of the researches sponsored by Committee C-6 on Drain Tile were published during 1933. Technical Bulletin No. 358 of the U. S. Department of Agriculture, "Laboratory and Field Tests of Concrete Exposed to the Action of Sulphate Waters," by Dalton G. Miller and Philip W. Manson, presents data upon the durability of concrete drain tile in alkali soils and manufacturing methods to increase that durability. Bulletin 108 of the Iowa Engineer-

ing Experiment Station, "Loads upon Pipe in Wide Ditches," by W. J. Schlick, gives the results of studies of the loads in ditches of different widths and with vertical and sloping sides. The other studies of the durability of concrete structures and concrete drain tile in alkali and peat soils have been continued.

Masonry Building Units

Committee C-10 has been actively engaged during the past year in an endeavor to improve the specifications for hollow masonry building units. Attention has also been given to definitions for structural clay tile and to capping methods for strength tests of concrete masonry units. In response to a widespread dissatisfaction with the standards for structural clay tile, the committee has prepared a complete revision in the form of separate tentative specifications.

Some of the more important changes in the new tentative specifications concern classification and the method of specifying weights. Other changes, thought to be improvements, are the placing of restrictions on the thickness of webs and shells for end construction load-bearing tile, and the width of cells of load-bearing side construction tile.

Concrete and Concrete Aggregates

In response to an urgent need for specifications for ready-mixed concrete due to the increasing use in all types of construction of concrete from central mixing plants, Committee C-9 drew up a complete set of requirements for the materials, proportioning, mixing, delivery, quality, testing, inspection and acceptance of ready-mixed concrete for all purposes. Suggested modifications of the specifications have been received since its publication and are being considered. Field and laboratory tests for determining the absorption of water by concrete aggregates were developed due to its importance in arranging proportions for concrete mixes. Improvements were made in the standard tests for organic impurities, sieve analysis and the storing and making of compression test specimens.

The proposed specifications for light-weight aggregate that were withdrawn from the preprinted report of Committee C-9 are being revised in the light of numerous criticisms and suggestions received.

Work on standard methods for permeability of concrete is progressing. Definitions for a number of terms relating to concrete and concrete aggregates are also under consideration for an early report.

Studies are being made of a method for ascertaining the percentage of voids in coarse aggregate, and methods of tests for determination of soft particles in aggregates. The Subcommittee on Curing of Concrete is devoting its attention to development of a standard laboratory method for determining the efficiency of materials proposed for use as curing agents and some extensive research projects on this problem are in progress. An early report is expected on the development of a standard method for determining the constituents of fresh concrete. The subcommittee on conditions affecting durability of concrete in structures is drafting methods for the guidance of concreting operations in such a manner as to render failure practically impossible. An important feature of the committee's work this year is the joint effort with Committee D-4 on Road and Paving Materials to revise and harmonize the various methods of the Society for determining silt content and specific gravity of aggregates.

In papers appended to the report, B. Kellam discusses "The Action of Water on Concrete," and H. R. Nettles and J. M. Holme report "A Study of the Analysis of Fresh Concrete with the Dunagan Buoyancy Apparatus."

Road Materials

The new tentative specifications for concrete for pavements are the result of some two years' work by a subcommittee of Committee D-4 on Road and Paving Materials, undertaken because it was felt that the existence of specifications would greatly influence and extend the knowledge and use of the best practice available. Improvements were made in the tests for abrasion of rock, loss on heating of oil and asphaltic compounds and the tests for bituminous emulsions. The specifications for calcium chloride have been broadened in scope and now cover a product suitable for acceleration and curing of concrete, and general road purposes, including its original application for dust palliatives on highways.

"A Qualitative Test for Determining the Degree of Heterogeneity of Asphalts" was described in a paper by G. L. Oliensis. The test depends upon the precipitation that takes place when such asphalts are dissolved in or dispersed by certain petroleum naphthas. Gene Abson described a "Method and Apparatus for the Recovery of Asphalt," which experimental data indicate is applicable to a wide range of bituminous materials commonly used in paving and other types of construction.

Tests on full-size concrete pavement sections, by the U. S. Bureau of Public Roads, to investigate effect of vibration and delayed finishing were described by F. H. Jackson and W. F. Kellermann in a paper on "Further Studies of Paving Concrete." These tests indicate that by using vibratory equipment of the type described it is possible to place and finish drier concrete containing considerably more coarse aggregate than methods now in common use. A method of delayed finishing for the purpose of removing excess water, also described, increases the density and strength of the pavement.

Bituminous Waterproofing

Committee D-8 on Bituminous Waterproofing and Roofing Materials presented new specifications for asphalt cap sheet surfaced with mineral granules designed to cover a material which has come into extended use in the roofing industry in recent years. The committee also withdrew from standard a number of specifications for asphalt roll-roofing and shingles with various types of surfacing material because changing practice, especially concerning the use of fillers in roofing coating, has rendered these specifications more or less out of line with practice in the industry. The committee revised the tentative methods for testing this type of material so as to provide a means of determination of the fillers employed.

Further work has been done on accelerated weathering tests. The current report contains another report on these studies and a proposed test procedure published as information. The work is being continued and it is expected further information will be available this year. It is the hope of the committee that this work will eventually result in standard practice which will enable roofing materials to be classified as to their probable life in service without the long time necessary for actual service tests.

Preservative Coatings

Committee D-1 on Preservative Coatings for Structural Materials has been particularly industrious in the preparation of new specifications and test methods and the improvement and adoption of standards. Spirits of turpentine, shellac varnish, tricresyl phosphate, industrial benzene, toluene, xylene, and wood panels for accelerated weather tests were covered by new specifications, while new tests were developed for nitrocellulose base solutions and tricresyl phosphate. Sixteen tentative specifications and tests were adopted as standard while revisions were made in seven standards. An apparatus and test procedure for determining the consistency of the low-viscosity lacquers and lacquer enamels were developed and added to the tentative methods. Work under way on methods for varnish includes tests for acid values, alkali resistance, skinning and adhesion.

All the specifications and tests for pigments, paints, varnishes, lacquers and paint materials prepared by the committee have been made available for the first time in a single publication. This volume has proved to be a valuable and most useful compilation of A.S.T.M. standards on these protective coatings.

Naval Stores

Committee D-17 on Naval Stores has been very active in developing and studying various tests for rosin. A proposed viscosity test which follows essentially the ring-and-ball method has been prepared. A cooperative series of viscosity tests on four samples of rosin using this method has been reported. Further studies of the method are now under way. The committee also completed the preparation of proposed methods of sampling and testing rosin which include tests for acid and saponification number, unsaponifiable matter, insoluble matter, ash, and volatile oils. These methods are being used as the basis for further studies, which include in addition methods for predetermining the tendency of rosin to crystallize, size-making value and alum test, and tests for the control and prevention of darkening and volatile matter on heating.

Petroleum Products and Lubricants

Committee D-2 on Petroleum Products and Lubricants had another very productive year. The Symposium on Motor Lubricants at the New York Regional Meeting was arranged under the sponsorship of Technical Committee B. Committee D-2 submitted the test for knock characteristics of motor fuels which was accepted as tentative by Committee E-10 in March. This method, known as the C.F.R. Motor Method, is based on the apparatus and procedure developed by the Cooperative Fuel Research Committee. Work on the Sligh oxidation test has been undertaken by a new subcommittee and a special committee has been appointed to cooperate with the Federal Specifications Board in a revision of federal specifications for petroleum products.

The viscosity test for petroleum products was revised to include test temperatures of 140 and 180 F. for road and paving materials. The introduction during the past few years, of oils containing pour-point depressants made desirable the preparation of a tentative revision of the cloud and pour test.

A special subcommittee is undertaking the expansion of the abridged volume correction table to contain a new group of data for low-gravity oils. The report on The Significance



of Tests of Petroleum Products, which was originally published in 1929, is being revised to bring it up to date.

Two items on the program of Technical Committee C on Fuel Oils are cooperation with the Technical Committee on Lubricants and Liquid Fuels of the Federal Specifications Board on a further revision of the commercial standard for fuel oils and plans for the extension of the specification to include requirements for Diesel fuels.

The organization of the Committee on Nomenclature and Methods of Testing Petroleum Products and Lubricants of the International Standards Association (I.S.A. Technical Committee No. 28) was completed and a meeting of the committee was held in London in July in connection with the World Petroleum Congress sponsored by the Institution of Petroleum Technologists. The American representative on this committee, R. P. Anderson, secretary of Committee D-2, attended the World Petroleum Congress as an official representative of the Society.

Coal and Coke

Committee D-5 on Coal and Coke recommended for adoption as standard the tentative method of sampling coal by ball-mill method. It also presented revisions of the tentative method of sampling coke for analysis and the standard test for size of anthracite. A new subcommittee, designated Subcommittee XII on Sampling Coal at Coal-Cleaning Plants, was organized, and has assembled considerable data regarding sampling of coal for analysis and sampling for float-and-sink methods of determining extraneous impurities in coal.

The subcommittee on friability of coal investigated different methods of test for determining the resistance of coal to breakage on handling—these include drop tests similar to the coke shatter test, and tumbler tests using either laboratory ball mills or large drums such as used for testing the strength of coke.

A method of testing the agglutinating properties of coal as developed by the U. S. Bureau of Mines was applied to a number of coals with a view of evaluating this test method for determining the caking properties of various coals when burned on grates. This test, which consists in determining the crushing strength of small buttons made of a mixture of fine coal and Ottawa sand after being carbonized at 950 C., is described in a paper by W. A. Selvig, B. B. Beattie and J. B. Clelland on "Agglutinating-Value Test for Coal."

Considerable work is being done on various methods for determining pulverizing characteristics of coal, particularly laboratory grindability methods. Committee D-5 is following this work very closely. A paper by R. A. Sherman, C. E. Irion and E. J. Rogers, on "A Study of Adsorption as a Method for the Determination of the Surface of Pulverized Coal," describes studies on this subject carried out at Battelle Memorial Institute.

The Sectional Committee on Classification of Coals, functioning under A.S.A. procedure, has been very active in collecting and correlating data on the properties of American coals. Extensive studies have been made of systems for the scientific classification of American coals, based principally on inherent chemical and physical properties, constitution and geological considerations. As a result of this work, proposed specifications for the classification of coal by rank and specifications for classification according to use have been prepared and after approval by the sectional committee will be submitted to the A.S.T.M. for publication as tentative.

Fire Tests

The outstanding action in 1933 by Committee C-5 on Fire Tests of Materials and Construction was the adoption as standard of the specifications for fire tests of building construction and materials, which specifications were first issued as tentative in 1917. As they do not have a wide application—tests under them occurring only at a limited number of stations equipped to make them—they were retained in tentative form for many years so that an extended experience in their use could be obtained before advancing them to standard.

Considerable progress has been made in the preparation of specifications for testing protectives (doors) on interior wall openings. Recent legislative requirements impose functions that had not hitherto been deemed essential and have necessitated further study which has delayed the completion of specifications. Work on suitable fire tests of lumber, acoustical linings in buildings, and scaffolding has been handicapped by the still prevalent unfavorable economic conditions.

Timber and Timber Preservatives

Committee D-7 on Timber revised the standard specifications for structural timbers providing a broader and more detailed classification of thicknesses and the introduction of dressed sizes and tolerances. This revision was prepared in cooperation with the American Railway Engineering Assn. A number of improvements in the methods of sampling and analysis of creosote oil were adopted and the methods issued separately as standards. The changes made are the outcome of several years' cooperative work with the American Wood-Preservers' Assn. and the American Railway Engineering Assn. A thorough survey is being made of timber piles in view of the limited scope of the present specifications. The committee is endeavoring, in cooperation with the A.R.E.A., to broaden the specifications to include piles for lighter bridges and buildings.

Further studies of electrical measurements show that it is possible to obtain the approximate moisture content of heavy timbers by inserting a pair of electrodes to a depth of one fourth the thickness of the timbers. The measurement is less accurate for contents over 18 per cent. The committee is giving consideration to further definitions dealing with creosote and other timber preservatives, particularly coal-tar creosote.

Electrical Insulating Materials

Committee D-9 on Electrical Insulating Materials completed specifications for flexible varnished tubing and for black bias-cut varnished cloth tape used for electrical insulation. These are the first purchase specifications prepared by this committee. A general test for thickness applicable to sheet and tape materials and to mica was standardized. Revisions were adopted in the tests for insulating oils, molded materials, insulating paper, varnished cloths and tapes, and cable compounds.

Committee D-9 deals with a wide variety of electrical insulation and accordingly has under way an extensive program on materials and test methods. A number of projects now under way were briefly summarized in the December BULLETIN. Additional subjects include impact fatigue studies of plastic, molded materials; specifications and tests



for molding powders; tests for flammability and heat resistance, compressibility and insulation resistance of laminated sheets.

Rubber Products

Committee D-11 on Rubber Products has devoted its attention to the development of test methods for rubber products rather than sponsoring materials specifications. A method of classification and tests for the various types of power transmission belting were formulated as were also methods of tests for rubber hose, of both the wrapped and braided constructions. Detailed requirements for both standard and heavy cotton braid on insulated wire and cable, changes in the cable tape sections and a number of minor changes have put the two existing specifications into excellent form and in accord with the best and most economical manufacturing practice.

With increasing uses of rubber in automobile construction, the proper tests for measuring the adhesive strength of rubber to metal has been a problem of great importance to both the rubber and automotive industries. The development of standard tests for adhesion of rubber in such applications has been undertaken by a new subcommittee.

The development in the last few years of artificial rubbers that swell less than natural rubber has created considerable interest in the preparation of compounds more resistant to swelling in oils or various solvents. A new subcommittee has been formed to develop suitable tests for volume increases of rubber in such liquids.

Valuable information on the reliability of the standard test for the stress-strain relation of rubber was given in a report on tests by 13 cooperating laboratories of a single compound with unaged specimens cured in a single laboratory.

In evaluating rubber compounds to be used in compression for purposes of vibration absorption, the measurement of the resistance of the rubber to permanent distortion is important. This property "compression set" is being studied and methods for its determination developed.

Textile Materials

New specifications were prepared by Committee D-13 on Textile Materials for Holland cloth and asbestos roving and test methods for the determination of copper and manganese in textiles. Requirements for single twist and a method for its determination which considerably lessens the effects due to the personal equation of the operator were incorporated in the yarn specifications and the tire fabric standards. The need for a shrinkage test for washable cotton fabrics prompted the preparation of a shrinkage test. The procedure is based on that developed by the American Association of Textile Chemists and Colorists and is in general agreement with that of the Federal Specifications Board.

A comprehensive analytical key for the qualitative identification and quantitative analysis of mixtures of all important fibers of mineral, animal and vegetable origin was prepared. These methods supersede the former methods of identification of textiles. An extensive glossary of definitions and terms for textile materials was also completed.

Committee D-13 has been very active in perfecting its standards and in undertaking the development of new subjects in the textile field. Among the more important of these are the following: Work is in progress on specifications for single-yarn tire-chamber fabrics, and plans are being made for the development of a fatigue test for tire cord. Plans

are being formulated for the drawing of specifications for typewriter ribbons and automotive webbing. A method for measuring the breaking strength of rayon fabrics when wet is also being developed, and a method for testing rayon fabrics for launderability is under consideration. Development of a complete glossary of terms and definitions relating to the wool industry is about complete. Work is in progress on specifications for woolen yarn. The method for the determination of regain is being pushed so as to make it available for use in connection with the wool code. An investigation of the applicability of micro-analytical methods in determining small amounts of copper and manganese in textiles is in progress. A study is being made of present methods for the determination of sizing materials. A revision of the asbestos tape specifications is in preparation and work on dielectric resistance of tape is under consideration. In the near future the committee also plans to work on suitable tests for fastness of dyed fabrics to washing and light; methods for determining the presence of oxycellulose and hydrocellulose in bleached cotton fabrics; and a method for testing the waterproofness of fabrics.

Methods of Testing

Committee E-1 on Methods of Testing has formulated new methods for notched-bar impact tests (Izod and Charpy types) for metals. Extensive improvements were made in the methods of verification of testing machines and in the compression test and Rockwell hardness tests for metallic materials. A new subcommittee on flexure testing was appointed to study and coordinate the various tests now in use. A new set of definitions for the terms "consistency" and "plasticity" were prepared and published as information.

A round-table discussion on industrial applications of particle size measurements, held at the Regional Meeting in March, was sponsored by the Technical Committee of E-1. This was devoted to the various methods and techniques used by investigators today in particle size measurements of pigments, dust, coal, cement and soils. In response to an increasing demand for a standard procedure, a method of analysis for the particle size distribution of sub-sieve size particulate substances has been prepared. The factors of major importance in the collection of data on this subject were pointed out by E. J. Dunn, Jr., and John Shaw in a paper on "Factors in the Presentation and Comparison of Particle Size Data."

The Manual on Presentation of Data was an outstanding contribution by the technical committee on this subject in its long-range program on the use of scientific methods in the collection, analysis, interpretation and presentation of test data.

The problems of collection of standardization data were discussed in papers by J. R. Townsend on "Planning for the Collection of Standardization Data," and by S. M. Osborne and P. S. Olmstead on "Quality Control in Practice Using Inspection Results."

The impact resistance of hardened materials such as tool steels has been the subject of much study. An apparatus and method in which a specimen is fractured torsionally under impact has been devised by G. V. Luerssen and O. V. Greene and described in a paper on "The Torsion Impact Test." This machine obviates difficulties formerly experienced, resulting from stress concentration due to character of specimen and load application, and makes possible comparisons of impact values.

